Name:

at1118paper: Complete the Square (v403)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 58x = -837$$

Add $\left(\frac{-58}{2}\right)^2$, which equals 841, to both sides of the equation.

$$x^2 - 58x + 841 = 4$$

Factor the left side.

$$(x - 29)^2 = 4$$

Undo the squaring. We need to consider both $\pm\sqrt{4}$.

$$x - 29 = -2 \quad \text{or} \quad x - 29 = 2$$
$$x = 27 \quad \text{or} \quad x = 31$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 28x = 128$$

$$x^2 + 28x + 196 = 324$$
$$(x + 14)^2 = 324$$
$$x + 14 = \pm 18$$
$$x = -32 \quad \text{or} \quad x = 4$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 56x = -775$$

$$x^2 - 56x + 784 = 9$$
$$(x - 28)^2 = 9$$
$$x - 28 = \pm 3$$
$$x = 25 \quad \text{or} \quad x = 31$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 40x = 441$$

$$x^2 - 40x + 400 = 841$$
$$(x - 20)^2 = 841$$
$$x - 20 = \pm 29$$
$$x = -9 \quad \text{or} \quad x = 49$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 50x = -429$$

$$x^2 + 50x + 625 = 196$$
$$(x + 25)^2 = 196$$
$$x + 25 = \pm 14$$
$$x = -39 \quad \text{or} \quad x = -11$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 22x = 455$$

$$x^2 + 22x + 121 = 576$$
$$(x + 11)^2 = 576$$
$$x + 11 = \pm 24$$
$$x = -35 \quad \text{or} \quad x = 13$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 46x = -528$$

$$x^2 + 46x + 529 = 1$$
$$(x + 23)^2 = 1$$
$$x + 23 = \pm 1$$
$$x = -24 \quad \text{or} \quad x = -22$$